STATE OF SOUTH CAROLINA)

BEFORE THE
PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA

Application of

Duke Energy Carolinas, LLC
for Approval of Energy Efficiency Plan Including an Energy Efficiency Rider and Portfolio of Energy Efficiency Programs.

COVER SHEET

DOCKET
NUMBER: 2007-358-E

(Please type or print)

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DOCKETING INFORMATION (Check all that apply)

☐ Emergency Relief demanded in petition ☐ Request for item to be placed on Commission's Agenda expeditiously

☒ Other:

INDUSTRY (Check one)

- ☒ Electric
- ☐ Electric/Gas
- ☐ Electric/Telecommunications
- ☐ Electric/Water
- ☐ Electric/Water/Telecom.
- ☐ Electric/Water/Sewer
- ☐ Gas
- ☐ Railroad
- ☐ Sewer
- ☐ Telecommunications
- ☐ Transportation
- ☐ Water
- ☐ Water/Sewer
- ☐ Administrative Matter
- ☐ Other:

NATURE OF ACTION (Check all that apply)

- ☐ Affidavit
- ☐ Agreement
- ☐ Answer
- ☐ Appellate Review
- ☐ Application
- ☐ Brief
- ☐ Certificate
- ☐ Comments
- ☐ Complaint
- ☐ Consent Order
- ☐ Discovery
- ☐ Exhibit
- ☐ Expedited Consideration
- ☐ Interconnection Agreement
- ☐ Interconnection Amendment
- ☐ Late-Filed Exhibit
- ☐ Letter
- ☐ Memorandum
- ☒ Motion
- ☐ Objection
- ☐ Petition
- ☐ Petition for Reconsideration
- ☐ Petition for Rulemaking
- ☐ Petition for Rule to Show Cause
- ☐ Petition to Intervene
- ☐ Petition to Intervene Out of Time
- ☐ Prefiled Testimony
- ☐ Promotion
- ☐ Proposed Order
- ☐ Protest
- ☐ Publisher's Affidavit
- ☐ Report
- ☐ Request
- ☐ Request for Certificatio
- ☐ Request for Investigatior
- ☐ Resale Agreement
- ☐ Resale Amendment
- ☐ Reservation Letter
- ☐ Response
- ☐ Response to Discovery
- ☐ Return to Petition
- ☐ Stipulation
- ☐ Subpoena
- ☐ Tariff
- ☒ Other: Testimony of Rirchard G .Stevie, Ph.D.

BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. 2007-358-E

In re: Application of Duke Energy Carolinas, LLC For Approval of Energy Efficiency Plan Including an Energy Efficiency Rider and Portfolio of Energy Efficiency Programs	))))))	**TESTIMONY OF RICHARD G. STEVIE, PhD. FOR DUKE ENERGY CAROLINAS**

This document is an exact duplicate, with the exception of the form of the signature, of the e-filed copy submitted to the Commission in accordance with its electronic filing instructions.

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME, ADDRESS AND POSITION WITH DUKE ENERGY CORPORATION.

A. My name is Richard G. Stevie. My business address is 139 E. Fourth St., Cincinnati, Ohio. I am Managing Director of Customer Market Analytics for Duke Energy Shared Services, Inc. ("Duke Energy Shared Services"), a wholly-owned service company subsidiary of Duke Energy Corporation ("Duke Energy"). Duke Energy Shared Services provides various administrative services to Duke Energy Carolinas, LLC ("Duke Energy Carolinas" or the "Company") and other Duke Energy affiliates including Duke Energy Ohio, Inc., Duke Energy Indiana, Inc., and Duke Energy Kentucky, Inc.

Q. PLEASE BRIEFLY DESCRIBE YOUR DUTIES AND RESPONSIBILITIES AS MANAGING DIRECTOR OF THE CUSTOMER MARKET ANALYTICS DEPARTMENT.

A. I have responsibility for several functional areas including load forecasting, load research, demand side management ("DSM") analysis, market research, load management analytics, and product development analytics. The Customer Market Analytics Department is responsible for providing functional analytical support to Duke Energy Carolinas as well as the other Duke Energy affiliates previously mentioned.

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.

A. I received a Bachelor's degree in Economics from Thomas More College in May 1971. In June 1973, I was awarded a Master of Arts degree in Economics from the University of Cincinnati. In August 1977, I received a Ph.D. in Economics from the University of Cincinnati.

My past employers include the Cincinnati Water Works where I was involved in developing a new rate schedule and forecasting revenues, the United States Environmental Protection Agency's Water Supply Research Division where I was involved in the research and development of a water utility simulation model and analysis of the economic impact of new drinking water standards, and the Economic Research Division of the Public Staff of the North Carolina Utilities Commission where I presented testimony in numerous utility rate cases involving natural gas, electric, telephone, and water and sewer utilities on several issues including rate of return, capital structure, and rate design. In addition, I was involved in the Public Staff's research effort and presentation of testimony regarding electric utility load forecasting. This included the development of electric load forecasts for the major electric utilities in North Carolina. I was also involved in research concerning cost curve estimation for electricity generation, rate setting and separation procedures in the telephone industry, and the implications of financial theory for capital structures, bond ratings, and dividend policy. In July 1981, I became the Director of the Economic Research Division of the Public Staff with the responsibility for the development and presentation of all testimony of the Division.

In November 1982, I joined the Load Forecast Section of The Cincinnati Gas & Electric Company ("CG&E"). My primary responsibility involved directing the development of CG&E's Electric and Gas Load Forecasts. I also participated in the economic evaluation of alternate load management plans and was involved in the development of CG&E's Integrated Resource Plan ("IRP"), which integrated the load forecast with generation options and demand-side options.

With the reorganization after the merger of CG&E and PSI in late 1994, I became Manager of Retail Market Analysis in the Corporate Planning Department of Cinergy Services and subsequently General Manager of Market Analysis with responsibility for the load forecasting, load research, DSM impact evaluation, and market research functions of the combined Cinergy company. After the merger of Cinergy Corp. and Duke Energy in 2006, I became the General Manager of the Market Analysis Department with responsibility for several areas, including load forecasting, load research, market research, DSM strategy and analysis, load management development, and business development analytics. Since then, I have become the Managing Director of the Customer Market Analytics Department.

In addition, since 1990 I have chaired the Economic Advisory Committee for the Greater Cincinnati Chamber of Commerce. I have been a part-time faculty member of Thomas More College located in Northern Kentucky and the University of Cincinnati teaching undergraduate courses in economics. In addition, I am an outside adviser to the Applied Economics Research Institute in

the Department of Economics at the University of Cincinnati as well as a member of an advisory committee to the Economics Department at Northern Kentucky University.

Q. ARE YOU A MEMBER OF ANY PROFESSIONAL ORGANIZATIONS?

A. Yes, I am a member of the American Economic Association, the National Association of Business Economists, and the Association of Energy Services Professionals.

Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY BEFORE ANY OTHER REGULATORY AGENCIES?

A. Yes. I have presented testimony on several occasions before the North Carolina Utilities Commission, the Indiana Utility Regulatory Commission, the Kentucky Public Service Commission, and the Public Utilities Commission of Ohio.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. My testimony explains: (1) the Market Potential Study performed on the energy efficiency programs proposed by Duke Energy Carolinas, (2) the DSMore model that the Company uses to evaluate energy efficiency programs, (3) the assumptions underlying the modeling, (4) the cost-effectiveness tests utilized, and (5) the results of these cost-effectiveness analyses. I will also discuss Duke Energy Carolinas' proposed method of evaluating, measuring, and verifying the impacts achieved from the proposed energy efficiency programs and a related issue on market transformation.

Q. PLEASE DESCRIBE THE EXHIBITS ATTACHED TO YOUR TESTIMONY.

A. Stevie Exhibit No. 1 presents a benefit/cost test matrix; Stevie Exhibit No. 2 provides program cost-effectiveness results; Stevie Exhibit No. 3 provides a proposed evaluation approach for South Carolina programs/measures; and Stevie Exhibit No. 4 outlines the expected timeframes and completion of evaluations.

Q. HOW WERE DUKE ENERGY CAROLINAS' ENERGY EFFICIENCY PROGRAMS DEVELOPED?

A. As Company Witness Schultz has testified, Duke Energy Carolinas developed its portfolio of programs in collaboration with interested stakeholders (the "Collaborative") over the past year. The energy efficiency[1] programs and measures considered by the Company and the Collaborative included (i) programs already offered and tested by Duke Energy Carolinas' affiliate utility operating companies, (ii) new programs suggested by the Collaborative, and (iii) existing programs offered by Duke Energy Carolinas in South Carolina. The Company then analyzed each potential program, applying multiple cost-effectiveness tests to compile the list of energy efficiency programs included in its Application for Approval of Energy Efficiency Plan, Including an Energy Efficiency Rider and Portfolio of Energy Efficiency Programs (the "Application"), filed with the Public Service Commission of South Carolina (the "Commission") on September 28, 2007 in the present docket.

[1] The term "energy efficiency," as used in this testimony, includes both energy efficiency/conservation and demand response measures.

II. MARKET POTENTIAL STUDY

Q. DID DUKE ENERGY CAROLINAS CONDUCT A MARKET POTENTIAL STUDY ON ENERGY EFFICIENCY PROGRAM POTENTIAL?

A. Yes. In conjunction with the Collaborative effort I just described, Duke Energy Carolinas conducted a Market Potential Study on energy efficiency program potential.

Q. WHAT WAS THE PURPOSE OF THE MARKET POTENTIAL STUDY?

A. The purpose of the Market Potential Study was to provide estimates of the market potential for energy efficiency for Duke Energy Carolinas' customers in South Carolina and North Carolina. The potential was evaluated separately for each state, but subsequently aggregated for a system level analysis. The study provided estimates of the technical, economic, and market potentials for energy efficiency.

The technical potential is defined as the amount of energy efficiency that could be obtained if all energy efficiency measures were adopted without regard to costs. This level of savings represents the upper limit of energy efficiency opportunity.

The economic potential is defined as the total energy savings available at a specified long-term avoided cost of energy. Measures with levelized costs that are lower than the avoided cost of energy are included in estimates of economic potential.

The market potential is defined as the total energy savings available from all programs recommended in the market potential study, considering cost-

effectiveness and adoption rates. In evaluating the market potential, the recommended programs have passed a rigorous cost-effectiveness review or were recommended for research or societal purposes.

Q. DID THE MARKET POTENTIAL STUDY EVALUATE ALL OF THE ENERGY EFFICIENCY PROGRAMS INCLUDED IN THE COMPANY'S APPLICATION?

A. The programs evaluated in the market potential study were developed independent from the Company's proposed programs. Table 1 below compares the programs in the market potential study to the ones proposed by the Company. This table illustrates the similarity between programs identified by the market potential study and those proposed by the Company. Where there are differences, Duke Energy Carolinas and the Collaborative are committed to reviewing new programs, revising programs, and filing revisions on a regular schedule.

Table 1

	Category	Duke Energy Carolinas Proposed	Market Potential Study Recommended
Residential			
	Energy Assessments	Mail-in Analysis Online Analysis On-site Audit & Analysis Low Income Multi-family Assessment	Mail-in Analysis Online Analysis On-site Audit with Direct Install
	Appliances & Lighting	Smart $aver (CFL, AC, Heat Pumps) Energy Star Certified	Energy Star Plus Energy Star Lighting & Appliances Manufactured Homes
	Low Income Services	Refrigerator Testing Replacement Weatherization Energy Efficiency Kits Efficient Equipment	Old Refrigerator Pick-up & Recycling Weatherization
	Education	Education Program for Schools	
	Direct Load Control	PowerManager	PowerManager
	Roofing		Energy Star Cool Roofs
Non-Residential			
	Energy Assessments	Online Analysis Telephone Interview Analysis On-site Audit & Analysis	
	Energy Efficient Equipment	Smart $aver - Retrofit - Replacement - New Construction	Key Accounts Custom Prescriptive New Commercial Construction
	Direct Load Control	PowerShare	PowerShare Energy Cooperative Call Option Pricing Program
Research			
	Recommissioning		C&I Retro-Commissioning Lite Pilot
	Financing	Efficiency Savings Plan	
	Direct Load Control	Advanced Power Manager	

Q. WHAT WERE THE RESULTS OF THE MARKET POTENTIAL STUDY?

A. Table 1 above displays the list of programs recommended in the Market Potential Study. For convenience, Table 2 is provided below to summarize how closely the cumulative energy savings calculated in the Market Potential Study compared with the cumulative energy savings projected for the programs the Company proposes in the Application.

Table 2

Energy Efficiency Market Potential Estimates
Table Values are Cumulative kWh Savings in Millions (000,000's)*

Year	Market Potential Study South Carolina	North Carolina	Total	Duke Energy Carolinas Proposal** Total
2008	26	66	92	180
2009	71	190	261	380
2010	132	369	500	552
2011	212	611	823	743
Total	**212**	**611**	**823**	**743**

*Numbers may not sum due to rounding.
**Duke Energy Carolinas numbers do not include demand response programs so that the values are directly comparable to the market potential study estimates.

III. THE DSMORE MODEL

Q. WHAT IS THE DSMore MODEL?

A. DSMore is a financial analysis tool designed to evaluate the costs, benefits, and risks of energy efficiency programs and measures. DSMore estimates the value of an energy efficiency measure at an hourly level across distributions of weather and/or energy costs or prices. By examining energy efficiency performance and cost effectiveness over a wide variety of weather and cost conditions, the Company is in a better position to measure the risks and benefits of employing energy efficiency measures versus traditional generation capacity additions, and further, to ensure that demand side resources are compared to supply side resources on a level playing field.

The analysis of energy efficiency cost-effectiveness has traditionally focused primarily on the calculation of specific metrics, often referred to as the California Standard tests: Utility Cost Test ("UCT"), Rate Impact Measure ("RIM") Test, Total Resource Cost ("TRC") Test, Participant Test, and Societal

Test. DSMore provides the results of those tests for any type of energy efficiency program (demand response and/or energy saving).

The test results are also provided for a range of weather conditions, including normal weather, and under various cost and market price conditions. Since DSMore is designed to be able to analyze extreme conditions, one can obtain a distribution of cost-effectiveness outcomes or expectations. Avoided costs for energy efficiency tend to increase with increasing market prices and/or more extreme weather conditions due to the covariance between load and costs/prices. Understanding the manner in which energy efficiency cost effectiveness varies under these conditions allows a more precise valuation of energy efficiency programs and demand response programs.

Generally, the DSMore model requires the user to input specific information regarding the energy efficiency measure or program to be analyzed as well as the cost and rate information of the utility. These inputs enable one to then analyze the cost-effectiveness of the measure or program.

Q. WHAT ENERGY EFFICIENCY PROGRAM OR MEASURE INFORMATION IS INPUT INTO THE MODEL?

A. The information required on an energy efficiency program or measure includes, but is not limited to:

- Number of program participants, including free ridership or free drivers
- Projected program costs, contractor costs and/or administration
- Customer incentives, demand response credits or other incentives

- Measure life, incremental customer costs and/or annual maintenance costs
- Load impacts (kWh, kW and the hourly timing of reductions)
- Hours of interruption, magnitude of load reductions or load floors

Q. WHAT UTILITY INFORMATION IS INPUT INTO THE MODEL?

A. The utility information required for the model includes, but is not limited to:

- Discount rate
- Loss ratio, either for annual average losses or peak losses
- Rate structure, or tariff appropriate for a given customer class
- Avoided costs of energy, capacity, transmission & distribution
- Cost escalators

Q. HOW ARE PROGRAMS OR MEASURES MODELED?

A. An analyst or program manager develops the inputs for the program or measure using information on expected program costs, load impacts, customer incentives necessary to drive customers' participation, free rider expectations, and expected number of participants. This information is used in initial runs of the model to determine cost-effectiveness and whether adjustments need to be made to a program or measure in order for it to pass the participant test, the first critical test.

The load impacts of the program or measure may be analyzed as a percent of savings reduction from the current level of use, as proportional to the load shape for the customer, or as an hourly reduction in kWh and/or kW. These approaches apply to energy saving programs and measures. For demand response

programs, the analyst must provide information on the amount of the expected load reduction and the possible timing of the reduction.

Q. WHAT IS THE SOURCE OF THE DATA FOR THE PROGRAM OR MEASURE?

A. Program managers and analysts develop the inputs for each program or measure from industry information derived from sources such as EPRI, Energy Star, E-Source, other utility program information, as well as from external experts in the industry. Over time, as impact and process evaluations are performed on South Carolina program results, information and input specifically related to South Carolina customers will begin to emerge and be used within future cost effectiveness analyses.

Q. WHAT IS THE SOURCE FOR THE UTILTY INPUTS TO THE MODEL?

A. The discount rate is obtained from the Company's last rate proceeding. The loss ratio is based upon past experience of the Company. The rate structure information is obtained from the Company's tariffs. The avoided capacity costs are based upon the peaker methodology, as set forth in the Company's 2007 avoided cost filing in Docket No. 1995-1192-E, and approved in PSCSC Order No. 2007-591. The information on avoided hourly energy costs is obtained from the most recent Company IRP analysis. These hourly energy costs are escalated annually through the period of study (20 to 25 years, typically) by using projected market energy costs . Over time, some of this avoided energy cost within the market will be "bought down" through higher capacity payments by investors (e.g., a base load unit that can deliver energy more cheaply, but at higher capacity

payment than a peaker). Ignoring these energy escalations over time would lead to an under-valuation of energy efficiency and suboptimal choices. Allowing the avoided energy costs to reflect initial Company IRP hourly production costs, and then annually escalating these costs along a market forecast, permits energy efficiency to by valued on a level playing field with supply. This approach insures that energy efficiency will be appropriately valued. Alternatively, the Company could choose to initialize the energy efficiency valuation at the current year's market. However, initializing the avoided costs to the Company's current IRP mitigates against possible over-spending in the short run, in the event that current market prices are significantly above average, and not reflective of a more reasonable and prudent long run forecast of avoided costs. Further, this approach provides the most accurate screen for energy efficiency cost effectiveness, in preparation for the most accurate measure of what is or is not cost effective. The ultimate test of energy efficiency cost effectiveness lies in the IRP model run comparisons with and without the energy efficiency programs inserted as resource options. An up-front energy efficiency screening process is necessary, though, since IRP production costing models are unable to accommodate a hundred or more energy efficiency resource options in the optimization modeling. So, pre-screening and bundling of energy efficiency options that are found to be cost effective is a more efficient and effective approach. The Company ultimately verifies and confirms the validity of this approach by comparing energy efficiency resource bundles that are cost effective versus energy efficiency resource bundles that are not believed to be cost effective, and insure that the IRP resource model

selections mirror these expectations. If they do not, the Company will adjust the energy efficiency screening process to reflect any differences in valuation with the IRP resource selections. It is the Company's intent to ultimately develop estimates of avoided energy costs consistent with the results obtained in the avoided cost filings and consistent with the level of load impacts expected from the energy efficiency programs. This provides the best overall estimate of the avoided energy costs that also embody any base load and intermediate avoided capacity costs not captured in the peaker capacity cost. This approach and analysis will be conducted annually, to insure that the estimation and valuation of avoided energy costs is consistent with the Company's alternative supply side resources, and with forward expectations of avoided energy costs.

The avoided transmission and distribution costs are obtained from the Company's most recent (2006) Cost of Service Study. The cost escalator information is also available within the sources cited above, and input into DSMore.

IV. COST-EFFECTIVENESS TESTS

Q. PLEASE DESCRIBE HOW ENERGY EFFICIENCY PROGRAMS AND MEASURES ARE ANALYZED.

A. The net present value of the financial stream of costs versus benefits are assessed, *i.e.*, the costs to implement the measures are valued against the savings or avoided costs. The resultant benefit/cost ratios, or tests, provide a summary of the measure's cost-effectiveness relative to the benefits of its projected load impacts. As previously mentioned, the Participant Test is the first screen for a program or

measure to make sure a program makes economic sense for the individual consumer. Duke Energy Carolinas also uses the Utility Cost Test ("UCT"), the Total Resource Cost Test ("TRC"), and the Ratepayer Impact Test ("RIM") Test for screening energy efficiency measures.

- The Participant Test compares the benefits to the participant through bill savings and incentives from the utility, relative to the costs to the participant for implementing the energy efficiency measure. The costs can include capital cost as well as increased annual operating cost, if applicable.

- The UCT compares utility benefits (avoided costs) to incurred utility costs to implement the program, and does not consider other benefits such as participant savings or societal impacts. This test compares the cost (to the utility) to implement the measures with the savings or avoided costs (to the utility) resulting from the change in magnitude and/or the pattern of electricity consumption caused by implementation of the program. Avoided costs are considered in the evaluation of cost-effectiveness based on the projected cost of power, including the projected cost of the utility's environmental compliance for known regulatory requirements. The cost-effectiveness analyses also incorporate avoided transmission and distribution costs, and load (line) losses.

- The TRC test compares the total benefits to the utility and to participants relative to the costs to the utility to implement the program along with the costs to the participant. The benefits to the utility are the same as those computed under the UCT. The benefits to the participant are the same as those computed under the Participant Test, however, customer incentives are considered to be a pass-

through benefit to customers. As such, customer incentives or rebates are not included in the UCT.

- The RIM Test, or non-participants test, indicates if rates increase or decrease over the long-run as a result of implementing the program.

The use of multiple tests can ensure the development of a reasonable set of energy efficiency programs, indicate the likelihood that customers will participate, and also protect against cross-subsidization. Stevie Exhibit No. 1 provides a matrix of the components included in each test. It should also be noted that none of the tests described above include external benefits to participants and non-participants which can also offset the costs of the programs.

Q. **WHAT WERE THE RESULTS OF THE PROGRAM ANALYSIS?**

A. The Company's Application to the Commission seeks, in part, approval to implement the following set of programs.

RESIDENTIAL CUSTOMER PROGRAMS

Residential Energy Assessments

Smart $aver® for Residential Customers

Low Income Services

Energy Efficiency Education Program for Schools

Power Manager

NON-RESIDENTIAL CUSTOMER PROGRAMS

Non-Residential Energy Assessments

Smart $aver® for Non-Residential Customers

Power Share®

RESEARCH PILOT PROGRAMS

Efficiency Savings Plan

Advanced Power Manager Program

The table attached hereto as Stevie Exhibit No. 2 contains the cost-effectiveness test results for each program. In general, the customer programs pass the UCT and TRC cost effectiveness tests, but not the RIM test. Development of these programs involved analyzing numerous measures. For the residential customer programs, all measures tested are included in the programs. For the non-residential customer programs, sixteen measures were dropped because they did not pass the UCT, TRC, or RIM Tests. The measures that failed tended to involve providing incentives for more energy efficient equipment associated with smaller sized motors or HVAC units. As a result, the expected load savings and associated avoided costs are low relative to the program costs and incentives.

The research pilot programs generally do not pass the cost-effectiveness tests. The Company is seeking to implement these research programs in order to investigate whether or not they can prove to be cost-effective in the future. The Company also considers the Advanced Power Manger Program to be a research program because although has relatively high test scores, the technology is unproven at this time.

Duke Energy Carolinas' Witness Schultz provides details regarding all of the proposed programs in his testimony.

V. MEASUREMENT AND VERIFICATION

Q. WHY IS EVALUATION, MEASUREMENT AND VERFICATION A CRITICAL COMPONENT OF DUKE ENERGY CAROLINAS' ENERGY EFFICIENCY PLAN?

A. Duke Energy Carolinas believes that successful, reliable and cost-effective energy efficiency programs require valid measurement and verification activities to: (1) assure that measures are installed and tracked properly; (2) verify or revise energy impacts; (3) monitor and ensure customer satisfaction; and (4) establish independent third-party evaluations and reviews to confirm energy impacts and to improve program delivery, efficiency and effectiveness.

Q. WHAT IS MEASUREMENT AND VERIFICATION?

A. Measurement and verification ("M&V") of energy efficiency programs and measures is an umbrella term (sometimes referred to as "EM&V," for Evaluation, Measurement, and Verification). There are five types of evaluation, in general. First, there is cost effectiveness evaluation which has been reviewed above. Second, impact evaluation strives to estimate the actual energy and demand load reductions realized from a program. Third, measurement typically refers to the metering, sub-metering, hours-use logger meter, statistical pre and post analyses, or other modes of measuring load reduction. Usually, measurement is a subset of an impact evaluation. Fourth, verification refers to the confirmation that customers actually installed the intended measures, that vendors are performing to expectation and that operational factors on the customer site are occurring such that the expected load savings can be realized. Finally, process evaluation refers

to a set of review and auditing methods that ascertain program effectiveness, efficiency, customer satisfaction, vendor satisfaction and other factors that contribute to program success. We propose to conduct these five types of evaluations through the use of the approaches set forth in Stevie Exhibit No. 3, and which has been reviewed by Duke Energy Carolinas Witness Nick Hall for consistency with national methods used for measurement and verification.

Q. **HOW DOES DUKE ENERGY CAROLINAS PLAN TO MEASURE, MONITOR AND VERIFY THE PROGRAMS?**

A. In general, the following approach will be used for monitoring and verification of programs:

Paper and Electronic Verification

- Paper or electronic verification will be completed on all applications for energy efficiency incentives by customers. As part of the application process, specific customer and measure data will be requested from applicants. Data requested will vary depending on the program, the measure, the equipment and the delivery of the application. Customers and/or contractors will be contacted for clarification and completion of the application if they fail to provide necessary information. Incentives will only be processed once verification is complete and information is entered into the electronic tracking systems. Verification information and all customer applications for incentives will be maintained by Duke Energy Carolinas.

Field Verification and Monitoring

- Field verification and monitoring, in most cases, will occur on customer premises using randomly selected samples of approximately 5% of installations. On-site visits will verify the installation of the claimed equipment in the proper application, confirm appropriate contractor or vendor processes and performance, and bring to light potential discrepancies or process improvements for the programs. Sample size will be larger for very large projects with significant incentives or energy impacts at risk. The size of such samples will be commensurate with the increased load savings as determined by Duke Energy Carolinas. Field training and support will be given to auditors performing assessments, to ensure quality both for communications and technical capabilities.

Customer Satisfaction Surveys

- Customer satisfaction surveys will be utilized to monitor satisfaction with program delivery and design, seek additional improvements to the program, and potentially uncover latent problems or issues with the measure/installation.

System Performance Tests

- System performance tests for load control resources will be conducted periodically to ensure that operational systems are working correctly, and that the projected load reductions are reliably available when needed. Load research metering samples and tracking will also be used to verify energy reductions.

If a problem is found with the installations or operations, the contractor and customer will be notified for correction. In addition, subsequent work or projects performed by that contractor will be monitored until Duke Energy Carolinas is satisfied that the installations or projects are being completed according to program specifications and operational standards. If the problems are not resolved to the satisfaction of Duke Energy Carolinas, that contractor, at the Company's discretion, may be eliminated from the program.

Duke Energy Carolinas has provided for the independent review and evaluation of its proposed programs by establishing initial evaluation plan summaries that propose specific energy efficiency evaluation studies and activities that will be competitively bid, designed, managed, supervised or conducted by independent and qualified evaluation professionals.

Evaluation studies will generally include methods such as loggers to capture appliance usage times, load research metering for hourly load analysis, statistical pre- and post-billing analysis using comparison control groups, engineering analysis and modeling, reference and comparisons to impact studies conducted in other regions for similar programs, phone and online interviews, and other methods reviewed within the International Performance Measurement and Verification Protocols, the California Evaluation Framework, and the Model Energy Efficiency Program Impact Evaluation Guide prepared as part of the National Action Plan for Energy Efficiency. These national protocols are described in greater detail by Nick Hall in his testimony. Stevie Exhibit No. 3

provides an initial design for the EM&V analysis for the proposed Energy Efficiency Programs.

Q. WHAT IS THE ESTIMATED COST AND TIMEFRAME FOR THE EVALUATION, MONITORING AND VERIFICATION?

A. Duke Energy Carolinas estimates that 5% of total program costs will be required to adequately and efficiently perform evaluations, monitoring and verification. Historical industry experience suggests that evaluation costs are typically 3% to 5% of total program spending. However, the Company is prepared to increase the level of spending as necessary to obtain reliable estimates of the load impacts from the programs.

Stevie Exhibit No. 4 attached hereto generally outlines the expected timeframes and completion of evaluations; however, final scheduling will be based on actual program initiation and realized participation rates and as such Stevie Exhibit No. 4 may be modified or revised accordingly.

Q. HOW WILL THE EVALUATION, MEASUREMENT, AND VERIFICATION RESULTS BE UTILIZED IN THE COMPANY'S RECONCILIATION AND TRUE-UP PROCESS FOR THE PROPOSED RIDER?

A. The EM&V process produces results on two main concepts: actual customer participation and actual load impacts. The reason these are important to the reconciliation and true-up process is that the original evaluation of program cost-effectiveness utilized projected numbers for participants in the programs and

estimates of the load impacts. The EM&V process provides actual values to develop the estimates of the true-up.

It would be helpful if the timing on availability of the actual participation and load impacts coincided. Unfortunately, that is not the case. Information on actual participation is available more quickly because it can be collected as the program is rolling out. Verification of installations will also occur contemporaneously. However, information on load impacts is more complex and tends to require rigorous impact evaluation studies, statistical billing analyses of pre and post usages, participant and non-participant surveys, and related activities that take time and care to complete to produce unbiased estimates of the load impacts. To do this, the Company must first wait several months to see how many participants there are in order to establish the sample size needed. And second, the Company must wait to collect post-installation load information. The measure has to be installed for a reasonable period of time before Duke Energy Carolinas can estimate the level of load impact. In addition, during this process, information will be collected on free-riders and free-drivers to adjust the level of the load impacts, where necessary.

The timing of the availability of participant and load impact results has implications for the reconciliation and true-up process. I expect that for the first true-up process, the Company will have actual participant information and possibly some load impact results, most likely for demand response programs (unless the timing of the true-up filing is during or immediately after the summer period). Load impact results for all programs will not be available until the

completion of the second year of program implementation. At that point, a true-up of load impacts can be undertaken from the beginning of the program through the second year.

In general, the Company anticipates that the participant results would be reconciled each year and load impact results every other year. However, updates to the load impact results would only be reconciled back to the previous impact evaluation, not to the beginning of the program.

In working through the EM&V process, it is important to note that the Company has a strong incentive to have these studies completed in as timely a manner as possible. Besides being at risk for results under the save-a-watt recovery mechanism, the Company needs to know quickly if these programs work in order to make sure the long-term generation plan is not affected. I will add that the complexity of the EM&V process is not the result of the structure of any specific regulatory recovery mechanism. Rather, it is the nature of energy efficiency programs in general. Reliable measurement and verification of energy efficiency impacts requires time. To the extent that the Commission prefers stability and simplicity in the estimation and implementation of the rider for energy efficiency cost recovery, it is possible to stipulate the load impacts for the period of one year, or until such time as a complete impact evaluation has been conducted, at which time any required change in the impacts can be applied going forward, but not affect a retrospective true up.

VI. MARKET TRANSFORMATION

Q. PLEASE DESCRIBE HOW THE EM&V ANALYSIS WILL REFLECT CHANGES IN THE MARKET AND PARTICIPANT BEHAVIOR OVER TIME.

A. Evaluation, measurement and verification will be conducted over time to verify the magnitude and persistence of the energy efficiency impacts achieved from both program participants, as well as from non-participants. Over time, the Duke Energy Carolinas' energy efficiency programs can affect the nature of the energy efficiency market such that customer behavior, vendor behavior, and even manufacturer behavior is altered. Where significant momentum is generated with respect to the adoption of increased energy efficiency, it is possible to transform efficiency markets such that customers begin to demand more efficiency from their vendors, equipment providers, and manufacturers. This increased demand for efficiency can occur from "word of mouth" interactions as well as customer exposure to Duke Energy Carolinas' advertising and promotion of energy efficiency or the result of distribution channel partnerships between Duke Energy Carolinas and networked trade allies or manufacturers.

Importantly, partnership arrangements and distribution networks that Duke Energy Carolinas structures to deliver more efficient equipment have an impact both on customers that are aware of the Company's efforts as well as those that are not. In either case, energy efficiency is likely to be adopted, but the more that Duke Energy Carolinas is able to move these markets toward more efficient choices for customers, the more cost effective is Duke Energy's realization of

efficiency gains. In other words, factors such as these can drive more customers to implement energy efficiency measures without actually receiving the Duke Energy Carolinas' incentives offered. This results in a transformation of the market that would not have occurred without the actions or interventions in the market by Duke Energy Carolinas. This market mechanism is often referred to as free driver behaviors, or sometimes labeled as spillover effects, in contrast to the more familiar concept of free ridership.

Free riders are those customers who receive an incentive but would have purchased the energy efficiency equipment even without the incentive, whereas free drivers are those customers who purchase energy efficient equipment without an incentive as a result of market transformation. Both market phenomena matter in the prudent pursuit of demand side resources and integrated resource planning. As such, Duke Energy Carolinas intends to measure both free rider and free driver impacts to more accurately gauge the overall cost-effectiveness of its energy efficiency efforts. For the Company's cost-effectiveness analyses provided here, the Company included the impacts of free riders, but not free drivers.

Q. HOW WILL THIS IMPACT BE IDENTIFIED?

A. These market phenomena will be measured through the EM&V process. Free ridership will be measured through customer surveys, statistical billing analysis, pre- and post- measurement processes and related studies among program participants, whereas free driver impacts will be measured among non-participant customer populations and/or through analysis of manufacturing trends and vendor surveys, or other types of analyses that are able to discern the influence and

contribution of these market effects on the adoption of energy efficiency measures and behaviors.

Q. WERE STEVIE EXHIBIT NOS. 1 THROUGH 4 PREPARED BY YOU OR UNDER YOUR SUPERVISION?

A. Yes.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes.

Benefits:	Participant Test	Utility Test	Ratepayer Impact Test	Total Resource Test	Societal Test
Customer Electric Bill Decrease	X				
Customer Non-electric Bill Decrease	X				
Customer O&M and Other Cost Decrease	X			X	X
Customer Income Tax Decrease	X			X	
Customer Investment Decrease	X			X	
Customer Rebates Received	X				
Utility Revenue Increase			X		
Utility Electric Production Cost Decrease		X	X	X	X
Utility Generation Capacity Credit		X	X	X	X
Utility Transmission Capacity Credit		X	X	X	X
Utility Distribution Capacity Credit		X	X	X	X
Utility Administrative Cost Decrease		X	X	X	X
Utility Cap. Administrative Cost Decrease		X	X	X	X
Non-electric Acquisition Cost Decrease				X	X
Utility Sales Tax Cost Decrease		X	X		
Costs:					
Customer Electric Bill Increase	X				
Customer Non-electric Bill Increase	X			X	
Customer O&M and Other Cost Increase	X			X	X
Customer Income Tax Increase				X	
Customer Capital Investment Increase	X			X	X
Utility Revenue Loss			X		
Utility Electric Production Cost Increase		X	X	X	X
Utility Generation Capacity Debit		X	X	X	X
Utility Transmission Capacity Debit		X	X	X	X
Utility Distribution Capacity Debit		X	X	X	X
Utility Rebates Paid		X	X		
Utility Administrative Cost		X	X	X	X
Utility Cap. Administrative Cost Increase		X	X	X	X
Non-electric Acquisition Cost				X	X
Utility Sales Tax Cost Increase		X	X	X	

Benefit/Cost Ratio = Total Benefits/Total Costs

Program Cost-Effectiveness Results

	Utility Test	TRC Test	RIM Test	Participant Test
RESIDENTIAL CUSTOMER PROGRAMS				
• Residential Energy Assessments	2.48	2.48	0.82	NA
• Smart $aver® for Residential Customers	3.07	2.29	0.88	4.17
• Low Income Services Agency Kits	4.94	4.94	0.96	NA
Low Income Weatherization	0.29	0.29	0.22	NA
• Energy Efficiency Education Program for Schools	2.81	2.81	0.84	NA
• Power Manager	6.46	124.18	6.46	NA
NON-RESIDENTIAL CUSTOMER PROGRAMS				
• Non-Residential Energy Assessments	NA	NA	NA	NA
• Smart $aver® for Non-Residential Customers	2.53	1.44	0.94	2.20
• PowerShare®	3.85	200.89	3.85	NA
RESEARCH PILOT PROGRAMS				
• Efficiency Savings Plan	NA	NA	NA	NA
• Advanced Power Manager Program	22.33	23.52	22.33	NA

Note: The NA values for the Participant Test occur because there are no costs to the customer to participate. The Non-Residential Energy Assessments program has NA values because the benefits and costs are captured in the Smart Saver® for Non-Residential Customers program. The Efficiency Savings Plan has NA values because no cost-effectiveness tests have been prepared. The research is expected to help develop the information that can be used to conduct the cost-effectiveness evaluation.

Proposed Evaluation Approach for South Carolina Programs/Measures

Residential Programs/Measures

Residential Energy Assessments

Energy Assessments Program provides informational and educational support and resources to customers, to help identify energy savings and opportunities to take advantage of energy efficiency promotions and incentives. The expected energy savings from education alone is not expected to be significant. However, the awareness and satisfaction with these activities will be monitored in participant and non-participant surveys to gauge awareness among customers of the outreach, the relative effectiveness of the outreach, and whether or not load reductions have occurred within the home. Impacts, if any, will be deduced from a billing analysis which controls for awareness and recall of the outreach activity. A process evaluation of this program will be conducted annually within the Residential Programs Process Review. International Performance Measurement and Verification ("IPMVP") protocols are not applicable to this type of program level analysis.

Home Energy House Call is an energy audit program. The program provides a report to the occupant recommending energy savings measures for their home. The service also provides measures that can be directly installed in the home, such as compact fluorescent bulbs and weather stripping. Program impacts will be computed using engineering-based estimation of energy savings for the installed measures, in conjunction with a more robust statistical assessment of energy use differences (bill savings) for the period of time before and after recommendations have been made. The post-retrofit period occurs after participants have had time to install the measures provided and/or to follow up on the auditor's recommendations regarding additional measures. Customer surveys will be conducted to determine whether there were changes in household occupancy and to ascertain which of the recommended energy savings measures were implemented by the customers one to twelve months following the audit. The focus of the impact assessments will be on kWh savings more than kW, given the complexity and variety of possible measures and energy savings recommendations. To control for bias and changes in the market, a control group of similar non participants will be used. Customer surveys will also gather information related to free ridership and customer satisfaction with the audit and the auditor. A process evaluation of this program will be conducted annually within the Residential Programs Process Review. This evaluation plan is consistent with IPMVP Protocol C.

Energy Efficiency Website provides customers with an online home audit tool to reduce energy consumption. While the energy savings per household may be relatively small, in this case, potentially a large number of customers can participate at minimal cost. The impact evaluation study will utilize engineering-based estimates that are informed by user survey data. Participant surveys following up with customers one to twelve months after the website visit will collect information on energy efficiency actions taken as a result of the tool, changes in household occupancy, prior knowledge of the measures, future intentions to install measures, retention and satisfaction with tool. A process evaluation of this program will be conducted annually within the Residential Programs Process Review. The IPMVP protocol is not applicable in this case.

Personalized Energy Report provides a customized usage analysis, personalized for that customer's home and usage characteristics, in a mailed or online form. Previous experience with statistical billing analysis results suggests that this approach can be used to uncover estimates of energy savings, even though these are expected to be relatively small compared to the total house load. In addition to a billing analysis, engineering-based estimates of savings will be developed, informed by survey data that is collected. The participant surveys will gather information on energy efficiency actions taken, prior knowledge of these measures, intentions, changes in other end uses including changes in household occupancy, persistence of savings and program satisfaction. A process evaluation of this program will be conducted annually within the Residential Programs Process Review. This evaluation plan is consistent with IPMVP Protocol C.

Smart $aver®

Smart $aver® Rebate Program for Air Conditioning provides incentives for more efficient air conditioning equipment, both central air conditioners and electric heat pumps. In some cases, additional compact fluorescent bulbs are provided as well. For new construction installations, prototypical customer homes will be modeled using an engineering simulation model designed for residential applications for comparison to post measure installation usage. This evaluation method will be conducted for retrofit applications as well, augmented by a statistical billing analysis. A comparison of estimates derived under the two methods will form the basis for insights into the predictive power of the engineering model. To maximize the estimation power of the billing analysis, a statistically adjusted engineering model will be developed that uses prior engineering estimates as explanatory variables, plus weather normalization and household-specific usage factors. Participant and non-participant surveys will be conducted, along with vendor satisfaction surveys or interviews, to estimate free ridership and uncover potential vendor issues that might impact customer satisfaction or program effectiveness. These surveys will also provide inputs to the statistical adjusted engineering models (e.g, equipment that was replaced, any changes in usage or house occupancy). A process evaluation of this program will be conducted annually within the Residential Programs Process Review. This evaluation plan is consistent with IPMVP Protocol C.

Smart $aver® Rebate Program for Lighting provides incentives for the efficient and cost effective delivery of compact fluorescent bulbs through innovative promotional channels. Since savings from this measure type will typically be small relative to total load, impact evaluations must be based on prior engineering-based estimates of kWh savings for the affected categories of lighting. Here, engineering algorithms for the installed lighting measures are reasonably well known. Further, the Energy Star program is a widespread and well studied program, which will allow for additional extrapolation of results from other studies for use in estimation of impacts for this program. Selective short term spot metering will be performed within randomly selected homes to confirm the expected engineering results and to ascertain the wattages of replaced bulbs. In addition, data loggers will be left within some of these homes to monitor the hourly usage patterns for the installed lights. The sampling of homes will be conducted such that results are representative of the participant population at large. Net savings estimation will be based in part using data from surveys for the program. These participant surveys will gather information about lighting products that were replaced, installation rates, delivery channel satisfaction and effectiveness, free ridership, spillover, persistence and satisfaction. A process evaluation of this program will be conducted annually within the Residential Programs Process Review. This evaluation plan is consistent with IPMVP Protocol B.

Low Income Program

Low Income Services Program provides a variety of customized measures installed in customers' homes, based on an on-site assessment of the premises. Because savings can be expected to be observable within a billing analysis framework, this approach will be used with pre- and post-participation data. The model will be weather normalized, and the analysis will be informed by survey data. To control for bias and changes in the market, a control group of similar non participants will also be used. A participant survey will collect information on energy efficiency actions taken as a result of the program, prior intentions, changes in other major end uses, changes in household occupancy, persistence and program satisfaction. A periodic process evaluation will be conducted as part of the Process Review for Low Income Customers. This evaluation plan is consistent with IPMVP Protocol C.

Education Sector Program

Energy Efficiency Education Program for Schools will utilize the current science/energy curriculum standards for all K-12 students in public and private schools who are served by Duke Energy Carolinas where Duke Energy Carolinas' online audit could be incorporated. The program is an in-school teacher and energy efficiency information program that will also promote student participation to take Duke Energy Carolinas' online home audit tool, on-site school audits, and encourage students or their parents to install Duke Energy Carolinas' energy efficiency kits and CFLs at their homes. The program may not produce large energy savings relative to the total usage at a residence. An engineering-based estimation of kWh savings will be performed, with information from surveys of teachers and students about energy efficiency actions taken, retention of information, and program satisfaction. Independent process evaluation review through the survey feedback is assumed to be sufficient for this program, given the expected small scale of savings. The IPMVP protocol is not applicable to this program.

School Incentive Program offers customized incentives to schools along with prescriptive incentives that are already part of the broader Non-Residential Prescriptive Incentive Program described below. Evaluation of impacts and processes will be conducted as part of the evaluation of the other non-residential programs.

Residential Demand Response Program

Power Manager provides financial incentives to customers for the periodic cycling of appliances during super peak hours. The program is designed to induce temporary reductions in usage that would not normally persist beyond one day. Given this, the focus of the impact evaluation will necessarily be the measurement and evaluation of short-term hourly changes in load due to the appliance cycling activity. Whole-house metering will be conducted on a randomly selected or stratified sample (stratified by usage and geography). This metered data will be analyzed within a statistical time-series framework to establish an estimate of "baseline" energy usage. The

baseline will capture demand patterns in the absence of the program. This will be compared to an analysis of loads in a statistical model that will be constructed to isolate the effect of the program. Due to the characteristics of the customers in the program, it is likely that a statistical model can and will be developed for each customer. However, the data will be pooled when appropriate to take advantage of any gains from data pooling or aggregation. In addition, spot metering and data logger samples will be taken during the peak season to confirm and bolster the estimated savings derived from the whole house metering study. Data loggers and instantaneous demand measures can be done quickly and reasonably cost effectively. This means increased precision of the load reduction estimates to bolster the base sample of whole house metered loads. Participant and non-participant surveys will be conducted to ascertain customer comfort, natural thermostat settings, program satisfaction, vendor satisfaction, and related issues. There is no free ridership to be estimated, in this case, since the estimation of the natural duty cycle of the appliances implicitly accounts for what would have happened in the absence of the program. A process evaluation study will be conducted at least every other year, and include the review of load reduction estimates as well as operational use of the resource within system operation contexts on peak. This evaluation plan is consistent with IPMVP Protocol C.

Non-Residential Programs/Measures

Non-Residential Energy Assessments

Non-Residential Energy Assessments provide education and outreach to commercial customers. There are three components—an on site option, an on-line version and a phone version. Program guidelines limit the use of on-site visits to customers with multiple facilities. For these participants, savings are anticipated to be large enough relative to total load that billing analysis should reveal savings from actions taken as a result of the program. Selective spot metering will also be performed, among randomly selected samples. For the on-line and phone participants, an engineering-based estimation of savings will be performed and in some cases building simulation modeling may be employed. The analysis will leverage survey data, spot metering and on-site information data collected on the smaller group. Surveys will be conducted to understand energy efficiency actions taken, prior intentions regarding these measures, changes in electric-using technologies or operations that impact usage, persistence of savings and program satisfaction. Process review will occur within the C&I Program Process Review. This evaluation plan is consistent with IPMVP Protocols B and C.

Non-Residential Smart $aver® targets HVAC energy savings among commercial customers. Here, evaluation activity will focus on a combination of techniques, including site visits, engineering-based estimation and participant billing analysis. Evaluation resources will be leveraged by using selective monitoring with data loggers and use of intermediate estimates of savings that can be used as inputs (explanatory variables) to billing analysis. Participant surveys will be conducted to learn more about equipment that was replaced (beyond what is in the tracking data base), prior intentions regarding equipment that was retrofitted, changes in other major end uses that impact electric usage, any changes in hours of operation, persistence and program satisfaction. Annual process evaluation should be conducted. This evaluation plan is consistent with IPMVP Protocols B and C.

C&I Prescriptive Incentive Program offers a combination of incentives for various measures primarily related to lighting, HVAC, pumps, and motors. Here, samples of participants will be selected for review and impact estimation studies. For each, some blend of selective monitoring and site visits will be performed at a small sample of facilities, with engineering-based estimation

and participant billing analysis of a larger group, where feasible. Participant surveys will be conducted to collect information needed to estimate net impacts. Participants will be asked about equipment that was replaced, energy efficiency actions taken, prior intentions regarding these measures, changes in other major end uses that impact energy consumption, hours of facility operation, persistence and program satisfaction. A process evaluation will be included in the annual C&I Program Process Review. This evaluation plan is consistent with IPMVP Protocols B and C.

C&I Custom Incentive Program offers incentives to customers for proposing unique energy savings opportunities that fit their site needs that are not covered within the prescriptive incentive program. Given the uniqueness of each context, this program will be evaluated using a combination of selective monitoring using data loggers, site visits, engineering-based estimation, building simulation modeling and single participant billing analysis. A population-level billing analysis would be problematic for several reasons—participants will tend to be large and diverse in terms of measures installed and the characteristics of their operations, and a reliable comparison group would be difficult to find. Participant surveys will be conducted to collect information on prior intentions regarding equipment that was replaced, changes in other major end uses that impact energy usage, potential spillover, changes in hours of operation, persistence and program satisfaction. A process review will be conducted within the overall C&I Program Process Review. This evaluation plan is consistent with IPMVP Protocols B and C.

Non-Residential Demand Response Program

PowerShare® provides financial incentives to large customers to reduce electricity use during super peak hours. The program is designed to induce temporary reductions in usage that would not be expected to persist beyond one day. Given this, the focus of the impact evaluation will necessarily be the measurement and evaluation of short-term hourly changes in load due to the interruption of activity. Given the MW savings attributable to this program, time-series based statistical regression analysis will be applied to hourly metered load to obtain the estimate of the load reduction. In addition, observations of compliance with interruption requests will be measured through system operations data, to confirm the individual findings for each customer. Therefore, each participant's hourly loads will be analyzed annually. This metered data will be analyzed within a statistical time-series framework to establish an estimate of the "baseline" energy usage. The baseline refers to customer demand patterns without the influence of the program, given the weather conditions or other local phenomena consistent with the interrupted day. This will be directly compared to actual loads within the statistical model to isolate the effect of the program. Since all of these participants already have hourly metered load, no additional metering is necessary. Where load reductions are too small relative to the metered load, sub-metering installations will be considered. Participant and non-participant surveys will be conducted to ascertain customer comfort, natural thermostat settings, program satisfaction, vendor satisfaction, and related issues. There is no free ridership to be estimated, in this case, since the estimation of the natural load forecast implicitly accounts for what would have happened in the absence of the program. A process evaluation study will be conducted, at least every other year, as part of the Demand Response Process Review. This evaluation plan is consistent with IPMVP Protocol C.

Research Pilot Programs/Measures

Efficiency Savings Plan is a financing pilot program in which customers are offered the option of financing the full cost of energy efficiency equipment and installation. Theoretically, the utility's payback threshold is longer than a customer's payback criteria, and therefore it is reasonable to expect benefits from transferring this risk from customers to the utility. The unique program design and financial components will be the central research focus rather than energy savings measurements. The energy equipment that customers install under the program is largely the same as what will be evaluated in other programs, providing a reasonable basis for gauging the level of impacts in this program. The innovation under consideration within this pilot centers on the new and unique financing proposition to the customer and program delivery mechanisms. Appropriate diligence will be applied to participant and non-participant surveys in order to diagnose any problems with the program theory or delivery mechanisms, and to better understand reasons for participation and satisfaction with various features of the program. Additional feedback will be obtained regarding energy efficiency actions taken, prior intentions, changes in other major end uses or usage patterns, persistence and satisfaction. For reasons outlined above, this evaluation plan is not eligible for specification of an IPMVP Protocol due the fact that program level assessments are required and not household level measurements of usage or energy.

Advanced Power Manager is a pilot program for which no measurement or verification is currently necessary. Once advanced infrastructure equipment has been installed, measurement activities will consist of surveys focused on the use and application of the hourly metered measures in conjunction with customer preferences for appliance cycling, usage control and demand response to various pricing signals.

Expected Timeframes for Completion of Evaluations

Program	Evaluation Type	Earliest Timeframe for Report – Months after program start	Latest Timeframe for Report – Months after program start
Residential Energy Assessments – Mail-in	Process	18	24
	Impact	24	36
Residential Energy Assessments – Online	Process	18	24
	Impact	24	36
Residential Energy Assessments – In-home	Process	18	24
	Impact	24	36
Residential Smart $aver®	Process	12	24
	Impact	18	30
Residential Low-Income Services	Process	18	24
	Impact	24	36
Energy Efficiency Education Program for Schools	Process	12	24
	Impact	18	24
Residential Power Manager	Impact	24	36
Non-Residential Energy Assessments – Online	Process	18	24
	Impact	24	36
Non-Residential Energy Assessments – Phone	Process	18	24
	Impact	24	36
Non-Residential Energy Assessments – On-site	Process	12	18
	Impact	24	36
Non-Residential Smart $aver®	Process	18	24
	Impact	24	36
Non-Residential PowerShare®	Impact	24	36
Research – Efficiency Savings Plan	Research Plan	12	18
Research – Advanced Power Manager	Research Plan	24	36

BEFORE
THE PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA
DOCKET NO. 2007-358-E

In Re:	)	
	)	
Application of Duke Energy Carolinas, LLC for Approval of Energy Efficiency Plan Including an Energy Efficiency Rider and Portfolio of Energy Efficiency Programs	)	**CERTIFICATE OF SERVICE**

This is to certify that I, Leslie L. Allen, a legal assistant with the law firm of Robinson, McFadden & Moore, P.C., have this day caused to be served upon the person(s) named below the **Testimony of Richard G. Stevie** in the foregoing matter by placing a copy of same in the United States Mail, postage prepaid, in an envelope addressed as follows:

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Dated at Columbia, South Carolina this 10th day of December, 2007.

Leslie L. Allen